WHAT IS CLAIMED IS:

1. A method for preparing a thin film of metal oxide containing one or more metal elements on a substrate, comprising the steps of:

applying a sol-gel solution containing said one or more metal elements to a surface of said substrate;

drying said sol-gel solution to prepare a dried gel film on said substrate;

soaking said dried gel film on said substrate in an alkaline aqueous solution containing at least one kind of metal element among said one or more metal elements in a container;

sealing said container; and

performing hydrothermal treatment for said dried gel film on said substrate in the sealed container to prepare said thin film of metal oxide on said substrate.

2. The method for preparing a thin film of metal oxide according to claim 1, wherein in said step of performing hydrothermal treatment, an internal temperature of said sealed container is set to a temperature of 374°C or lower.

3. The method for preparing a thin film of metal oxide according to claim 2, wherein in said step of performing hydrothermal treatment, an internal temperature of said sealed container is set to a temperature of no lower than 140°C and no higher than 240°C.

4. The method for preparing a thin film of metal oxide according to claim 1, further comprising the step of boiling said alkaline aqueous solution before said step of soaking.

5. The method for preparing a thin film of metal oxide according to claim 1, wherein said one or more metal elements contained in said metal oxide are barium and titanium;

said sol-gel solution comprises a barium acetate and a titanium alkoxide; and

said at least one kind of metal element contained in said alkaline aqueous solution is barium.

6. The method for preparing a thin film of metal oxide according to claim 1, wherein said one or more metal elements contained in said metal oxide are barium, strontium and titanium;

said sol-gel solution comprises a barium acetate, a strontium acetate, and a titanium alkoxide; and

said at least one kind of metal element contained in said alkaline aqueous solution are barium and strontium.

7. A thin film of metal oxide prepared by a method for preparing a thin film of metal oxide containing one or more metal elements on a substrate, which comprises the steps of:

applying a sol-gel solution containing said one or more metal elements to a surface of said substrate;

drying said sol-gel solution to prepare a dried gel film on said substrate;

soaking said dried gel film on said substrate in an alkaline aqueous solution containing at least one kind of metal element among said one or more metal elements in a container;

sealing said container; and

performing hydrothermal treatment for said dried gel film on said substrate in the sealed container to prepare said thin film of metal oxide on said substrate.

8. The thin film of metal oxide according to claim 7, wherein said thin film of metal oxide has substantially no carbon.

9. The thin film of metal oxide according to claim 7, wherein a leakage current in said thin film of metal oxide is 10^{-7} A/cm^2 or less when a voltage of 2V is applied to said thin film of metal oxide.

10. The thin film of metal oxide according to claim 7, wherein a relative dielectric constant of said thin film of metal oxide is 20 or higher.

11. A capacitor including a thin film of metal oxide containing one or more metal elements as a dielectric, wherein said thin film of metal oxide is prepared by a method for preparing a thin film of metal oxide containing one or more metal elements on a substrate, which comprises the steps of:

applying a sol-gel solution containing said one or more metal

elements to a surface of said substrate;

drying said sol-gel solution to prepare a dried gel film on said substrate;

soaking said dried gel film on said substrate in an alkaline aqueous solution containing at least one kind of metal element among said one or more metal elements in a container;

sealing said container; and

performing hydrothermal treatment for said dried gel film on said substrate in the sealed container to prepare said thin film of metal oxide on said substrate.

12. A memory comprising a capacitor which includes a thin film of metal oxide containing one or more metal elements as a dielectric, wherein said thin film of metal oxide is prepared by a method for preparing a thin film of metal oxide containing one or more metal elements on a substrate, which comprises the steps of:

applying a sol-gel solution containing said one or more metal elements to a surface of said substrate;

drying said sol-gel solution to prepare a dried gel film on said substrate;

soaking said dried gel film on said substrate in an alkaline aqueous solution containing at least one kind of metal element among said one or more metal elements in a container;

sealing said container; and

performing hydrothermal treatment for said dried gel film on

said substrate in the sealed container to prepare said thin film of metal oxide on said substrate.